Thomas, Prof. Cyrus.

The Manuscript Troano.

Phila., 1881.

THE MANUSCRIPT TROANO.[1]

BY PROFESSOR CYRUS THOMAS.

This manuscript was found about the year 1865 at Madrid, Spain, by the Abbe Brasseur de Bourbourg while on a visit to the Library of the Royal Historical Academy and named by him "Manuscript Troano," in honor of its possessor Don Juan de Tro y Ortolano.

So far as I am aware nothing more is known in reference to its history; we are not even informed by its last owner where or how he obtained it. In ordinary cases this would be sufficient to arouse our suspicions as to its genuineness, but in this case the work itself will dispel all such suspicions.

This work was reproduced in fac-simile by a chromo-lithographic process, by the *Commission Scientifique du Mexique* under the auspices of the French Government, Brasseur de Bourbourg being the editor.

The original is written on a strip of Maguey paper about four-

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[1] Extracts from a paper now being prepared by Professor Thomas for the Bureau of Ethnology, Smithsonian Institution.

teen feet long and nine inches wide, the surface of which is covered with a white paint or varnish on which the characters and figures are painted in black, red, blue and brown. It is folded fan-like into thirty-five folds, presenting when the folds are pressed together the appearance of an ordinary octavo volume. The hieroglyphics and figures cover both sides of the paper comprising seventy pages, the writing and painting of the figures having been apparently executed, after the paper was folded, so that the folding does not interfere with the writing.

A slight examination of this manuscript is sufficient to convince any one at all familiar with Landa's characters that those used here are substantially the same, be the significations what they may. On almost every page are to be found columns of characters agreeing precisely with those given by him as representing the Maya days. Are they used on account of the signification of the words they represent, as Brasseur supposed, or simply to designate days?

The determination of this point must be one important step toward ascertaining the object and contents of the work.

Another prominent feature of the manuscript is the great number of numerals or numeral characters—short straight lines and dots—found on every plate. These, together with the columns of day characters, constitute fully one half the written portion of the work; hence if we can ascertain the method in which, and the object for which, these were used, sufficient will have been learned to indicate, beyond doubt, the character of the work, and will render the task of deciphering the hieroglyphs much easier than to work at them blindly.

Assuming that the reader is familiar with what has already been written upon this subject, I will at once proceed with what I believe to be the correct explanation of the use of these two classes of characters in this manuscript, and which I believe is the key that will ultimately unlock its mysteries.

As I shall have occasion to refer very frequently to the Maya calendar, and cannot, without occupying too much space, give here a full explanation of it, I refer the reader to the following easily accessible works: " Bancroft's Native Races," Vol. II, and Dr. Valentini's article in the Proceedings American Antiquarian Society, giving here only the following brief summary:

TABLE I.

Nos.	No. of Maya Days.
1	Kan
2	Chicchan
3	Cimi
4	Manik
5	Lamat
6	Muluc
7	Oc
8	Chuen
9	Eb
10	Ben
11	Ix
12	Men
13	Cib
1	Caban
2	Ezanab
3	Cauac
4	Ahau
5	Ymix
6	Ik
7	Akbal

Their year consisted of eighteen months of twenty days each, and five intercalated or added days at the end. These added days—to make the full number, 365—were not counted in any of the months, as the month never counted more or less than twenty days. The names of these twenty days are given in the annexed table. Although they were sometimes numbered from 1 to 20, yet the usual method, especially in computations of time relating to religious feasts and ceremonies, was as shown in the table. Commencing with 1 they were numbered to 13, the following day instead of being 14 was numbered 1, the next 2, and so on to 13. As will be seen from the table, supposing it to represent the first month, the second month would begin with 8 Kan, and so on through the year as shown in the following table of the months and days:

TABLE II.

Names of Days.	Pop	Uo	Zip	Tzoz	Tzec	Xul	Yaxkin	Mol	Chen	Yax	Zac	Ceh	Mac	Kankin	Muan	Pax	Kayeb	Cumhu	Numbers of the Days of the Month.
Numbers of the Months.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Kan	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	1
Chicchan	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	2
Cimi	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	3
Manik	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	4
Lamat	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	5
Muluc	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	6
Oc	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	7
Chuen	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	8
Eb	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	9
Ben	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	10
Ix	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	11
Men	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	12
Cib	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	13
Caban	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	14
Ezanab	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	15
Cauac	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	16
Ahau	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	17
Ymix	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	18
Ik	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	19
Akbal	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	20

Intercalated Days.

Kan	10
Chicchan	11
Cimi	12
Manik	13
Lamat	1

If the first day of the year was Kan, as in this table, then each month would commence with Kan and end with Akbal, though numbered differently. If the last day of the 18th month was 9 Akbal, as shown in this table, the five added days would be 10 Kan, 11 Chicchan, 12 Cimi, 13 Manik and 1 Lamat; the first day of the next year would be 2 Muluc.

When the year began with 2 Muluc, the last day of the 18th month would be 10 Lamat and the five added days would be 11 Muluc, 12 Oc, 13 Chuen, 1 Eb and 2 Ben. The next year would then begin with 3 Ix. Following out this process we shall find the years commencing as follows: 1 Kan, 2 Muluc, 3 Ix, 4 Cauac, 5 Kan, 6 Muluc, 7 Ix, 8 Cauac, 9 Kan, 10 Muluc, 11 Ix, 12 Cauac, 13 Kan, 1 Muluc, 2 Ix and so on, the first day being in all cases one of these four. As 13 is a prime number it will require a cycle of 52 years—13 × 4—before we again reach 1 Kan. I give here a table of one of these cycles, showing the order of the years for this length of time. The names by which the years of the different columns are designated are given at the head of the columns.

TABLE III.

Kan.	Muluc.	Ix.	Cauac.
1	2	3	4
5	6	7	8
9	10	11	12
13	1	2	3
4	5	6	7
8	9	10	11
12	13	1	2
3	4	5	6
7	8	9	10
11	12	13	1
2	3	4	5
6	7	8	9
10	11	12	13

Although their system was somewhat complicated by this singular method of numbering the days and years, still it is not difficult to understand it so far. But in order to further complicate this calendar, which was undoubtedly devised by the priests as Landa truly says, " to deceive this simple people," another period called the Katun or Ahau was introduced. This period, according to most authorities, consisted of twenty years, but according to Perez of twenty-four. Instead of being numbered in regular order, one, two, three, &c., these periods were also numbered by the thirteen series, but in the following singular order: 13, 11, 9, 7, 5, 3, 1, 12, 10, 8, 6, 4, 2, the 13th Katun preceding the 11th, and so on.

The chief difficulty experienced in attempting to bring this period into harmony with the system so far as given, is, 1st. The uncertainty as to whether it consisted of 20 or 24 years; 2d. To place these periods in their proper positions in the great cycle, that is, to determine what year in any cycle was the *first* year of a Katun. If this can be done, then it is not difficult to compare

the years of the Maya calendar with those dated from the Christian era, if any one can be determined.

The reader will observe that we have so far proceeded upon the assumption that the first year of the cycle was 1 Kan, or in other words, that the Kan column always occupied the extreme left. That the four days, Kan, Muluc, Ix, Cauac—or "year bearers," as they were called by the Mayas—must follow in the order given, is manifest, but that Kan must come first does not follow from anything apparent in the system itself; either day may be the first, without any change in the system, but not without a difference in the result. There are some reasons apparent in the manuscript itself for believing that the author considered Cauac the first, or ruling day, and hence Kan the second, Muluc the third and Ix the fourth. One of these reasons will be given hereafter.

The importance of knowing which one of these days came first will be apparent from the following illustration: A certain event, for example, is dated a particular day in the year, 1 Ix. By reference to the tables we give here—one commencing with Kan and the other with Cauac—we see that if the former be the correct one, the year 1 Ix would be the 27th year of the cycle (it is marked with a star); if the latter, it would be the 40th, or 13 years later.

As we shall have to refer very frequently to the calendar, it becomes necessary that we construct one. Since the system admits of fifty-two changes in the day on which the year begins, it would require fifty-two calendars to include the years of one cycle, just as fourteen are required to suit all the years of our system—seven for the ordinary and seven for the leap years.

As it would require much time and space to write these out in

| | TABLE IV. | | | | TABLE V. | | |
Kan.	Muluc.	Ix.	Cauac.	Cauac.	Kan.	Muluc.	Ix.
1	2	3	4	1	2	3	4
5	6	7	8	5	6	7	8
9	10	11	12	9	10	11	12
13	1	2	3	13	1	2	3
4	5	6	7	4	5	6	7
8	9	10	11	8	9	10	11
12	13	1*	2	12	13	1	2
3	4	5	6	3	4	5	6
7	8	9	10	7	8	9	10
11	12	13	1	11	12	13	1*
2	3	4	5	2	3	4	5
6	7	8	9	6	7	8	9
10	11	12	13	10	11	12	13

full, I have adopted the expedient shown in the following table of abbreviating the work :

TABLE VI.

A CONDENSED MAYA CALENDAR.

Days of Month	13	12	11	10	9	8	7	6	5 / 18	4 / 17	3 / 16	2 / 15	1 / 14	Ix Column.	Muluc Column.	Kan Column.	Cauac Column.
1	7	13	6	12	5	11	4	10	3	9	2	8	1	Ix	Muluc	Kan	Cauac
2	8	1	7	13	6	12	5	11	4	10	3	9	2	Men	Oc	Chicchan	Ahau
3	9	2	8	1	7	13	6	12	5	11	4	10	3	Cib	Chuen	Cimi	Ymix
4	10	3	9	2	8	1	7	13	6	12	5	11	4	Caban	Eb	Manik	Ik
5	11	4	10	3	9	2	8	1	7	13	6	12	5	Ezanab	Ben	Lamat	Akbal
6	12	5	11	4	10	3	9	2	8	1	7	13	6	Cauac	Ix	Muluc	Kan
7	13	6	12	5	11	4	10	3	9	2	8	1	7	Ahau	Men	Oc	Chicchan
8	1	7	13	6	12	5	11	4	10	3	9	2	8	Ymix	Cib	Chuen	Cimi
9	2	8	1	7	13	6	12	5	11	4	10	3	9	Ik	Caban	Eb	Manik
10	3	9	2	8	1	7	13	6	12	5	11	4	10	Akbal	Ezanab	Ben	Lamat
11	4	10	3	9	2	8	1	7	13	6	12	5	11	Kan	Cauac	Ix	Muluc
12	5	11	4	10	3	9	2	8	1	7	13	6	12	Chicchan	Ahau	Man	Oc
13	6	12	5	11	4	10	3	9	2	8	1	7	13	Cimi	Ymix	Cib	Chuen
14	7	13	6	12	5	11	4	10	3	9	2	8	1	Manik	Ik	Caban	Eb
15	8	1	7	13	6	12	5	11	4	10	3	9	2	Lamat	Akbal	Ezanab	Ben
16	9	2	8	1	7	13	6	12	5	11	4	10	3	Muluc	Kan	Cauac	Ix
17	10	3	9	2	8	1	7	13	6	12	5	11	4	Oc	Chicchan	Ahau	Men
18	11	4	10	3	9	2	8	1	7	13	6	12	5	Chuen	Cimi	Ymix	Cib
19	12	5	11	4	10	3	9	2	8	1	7	13	6	Eb	Manik	Ik	Caban
20	13	6	12	5	11	4	10	3	9	2	8	1	7	Ben	Lamat	Akbal	Ezanab

As each of the four days (the year bearers) can have but thirteen different numbers, it is unnecessary for us to have more than thirteen columns of numbers; when we reach the thirteenth column, or month, we have passed through all possible changes of numbers, and the fourteenth month begins with one as did the first. Instead, therefore, of having eighteen columns in our table, we need to extend it only so as to include thirteen, as we can use the first, second, third, fourth and fifth respectively for the fourteenth, fifteenth, sixteenth, seventeenth and eighteenth months, as indicated by the numbers of the months which we have placed above the table.

The reader must bear in mind the fact that although we have numbered the months as commencing with the left hand column, which has 1 for its upper figure; yet this holds good only when the year is 1 Cauac, 1 Kan, 1 Muluc or 1 Ix, and for none of the other years. The first month of the year may be any one of the thirteen columns, thus, 8 Cauac, 8 Kan, 8 Muluc and 8 Ix have the second column—which has 8 as its top figure—as their first month, then the one with 2 at top will be the second month, and so on to the thirteenth (7 at top) which will be the 12th month. Then we go back to the first column (1 at top) for the 13 month, and so on to the one with 10 at top for the 18th month. As the months always retain the same order and numbers, by knowing the column with which the year begins, we can, by counting in this way, find any month for any possible year. We must here warn the reader against confounding the *days of month* with the *days of the week*, the latter being the ones by which the days are usually designated; we must also warn him against confounding the *numbers of the months* with the *top numbers of the columns.* I will now show how this table is to be used by giving one or two examples:

Given the day 8 Ahau and the year 11 Kan to find the month and *day of the month.* As the year is 11 *Kan,* we must look to the Kan column. By running our eyes down this column we find that Ahau is the 17th day; then by looking along the 17th transverse line we find the figure 8 to be in the column which has 5 at the top, which we find is the second (always counting both) from the column with 11 at top; hence 8 Ahau of the year 11 Kan is the 17th day of the 2d month.

In the same way we find that 8 Ahau of the year 11 Muluc is

the 12th day of the 12th month, but in this case we have to count the columns from the one having 11 at top (always inclusive) to the right through to the thirteenth (the one with 7 at top), and then go back to the first and count up to the one in which we find 8 in the twelfth transverse line.

In the Perez manuscript, translated by Stephens and published in his " Yucatan," Vol. II, we find it stated that one Ajpula died " in the year 4 Kan, the 18th day of the month Zip on 9 Ymix." The year 4 Kan begins with the column of our table which has 4 as its top figure; the third month (Zip) will then be the one with 5 at the top; running down this to the eighteenth transverse line, we find the figure 9, we also find that the 18th day of the Kan column is Ymix, agreeing exactly with the date given.

In the Manuscript Troano we find another method of giving dates, which is very common throughout the work, thus:
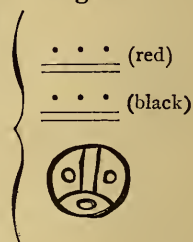
This, according to my interpretation, signifies 13 Ahau of the 13th month. As neither the year nor the day of the month is given, it is evident that we may find four dates satisfying the demand. Turning to our table we commence with the Ahau in the Cauac column, which we find is the second day of the month. The 13 in the second transverse we find in the column having 11 at the top; by counting *back* thirteen months (always including the one counted from and to) we find that the first month of the year is the one with 6 at the top, hence the year is 6 Cauac. The backward counting is exactly the reverse of the forward counting—count toward the left until the first column is reached, then return to the thirteenth and so on until the number of the month required is reached.

Proceeding in the same way with the Ahau in the Kan, Muluc and Ix columns, we find the years to be 4 Kan, 9 Muluc and 1 Ix.

We are now prepared to discuss the question as to whether the numerals and day characters are used in the manuscript simply as dates or not.

By counting, I find there are about 235 recognizable columns

of day characters in the work, eight-ninths of which contain five characters each. Why this number? If, as I suppose, and as above illustrated, each has four dates (four different years) this gives to each of these columns twenty years ($4 \times 5 = 20$), or one Katun, for even according to the theory of Perez, four years of his period were not generally counted.

But before testing this suggestion, I wish to call attention to a certain regularity in the order of the days in these columns. The left hand column of the middle division of Plate x is composed of characters representing the following days (always reading from the top downwards) in the order here given: Oc, Cib, Ik, Lamat, Ix. If we turn to the list of days and count from one of these names to the other, we shall find in each case an interval of six days. The other column, same plate and division, contains the characters for Ahau, Cimi, Eb, Ezanab and Kan, with an interval of six days between each two. The column in the middle division of Plate vi shows an interval of five days between each two; the columns on Plate xvii, of twelve days; a column on Plate xxxi, of sixteen days; but the usual interval is either six or twelve days.

Although the interval is usually the same throughout a column, there are occasional departures from this rule, for example, in the left hand column of the upper division of Plate xiii, they are 6, 6, 4 and 2 days.

This fact, which is a marked characteristic of the work, is sufficient to show, beyond a reasonable doubt, that the days are here used simply as dates, and not for the signification of the words, as Brasseur supposed.

I understand that Charency has noticed a regularity in the order of the days, but as I have had no opportunity of examining his work, I am unable to state whether it is the fact here mentioned or not.

By examining Plates xx–xxiii, we see such a strong resemblance between them that we are forced to believe they relate to one and the same subject; the left hand column of each, which extends the whole length of the plate, is the repetition of a single day character with red numerals over each character. In Plate xxiii the character repeated is Cauac, one of the year bearers; the numerals over them are as follows, and in the following order (reading from the top downwards): 10, 1, 5, 9, 13, 4, 8, 12, (?), 7, (?), 2, 6—two of them being obliterated.

Turning to Plate XXII we find the character for Kan repeated in the same way with the numerals over them as follows: 11, 2, 6, 10, 1, 5, 9, (?), 4, 8, 12, 3, 7, 11.

On Plate XXI the character for Muluc is similarly repeated, and the numerals are 12, 3, 6, 10, 1, 5, 9, 13, 4, 8, 2, 7, 3.

On Plate XX Ix is similarly repeated, and here the numerals are 13, (?), 8, 12, 3, 7, 11, 2, 6, 10, 1, 5, 9.

If we construct a table of years for two cycles, and compare these numbers with those in the table, we shall find the two precisely the same and in the same order, except the Muluc column which presents a partial variation which I will endeavor presently to explain. We give both Cauac and Kan tables.

If we run our eyes down the Cauac column of either table until we reach 10, we shall find the numbers from thence downwards as follows: 10, 1, 5, 9, 13, 4, 8, 12, 3, 7, 11, 2, 6, precisely as in Plate XXIII. The same thing is true in reference to the Kan and Ix columns.

The numbers on Plate XXI (Muluc) after the first two—12 and 3—skip to 6 and continue regularly from thence to 8. If we start with 12, we find the next to be 3 as given, the next is 6 instead of 7, as it should be; we notice that in the adjoining Kan column the next figure is 6, and the numbers thence to 8 as given. May we not suppose that the author of the manuscript had a similar table (with numeral characters) before him, and that in copying his eye fell on the wrong column? That such tables were used by them is rendered probable by the following quotation which Perez makes from an ancient manuscript in his possession:

TABLE VII.

Cauac.	Kan.	Muluc.	Ix.
1	2	3	4
5	6	7	8
9	10	11	12
13	1	2	3
4	5	6	7
8	9	10	11
12	13	1	2
3	4	5	6
7	8	9	10
11	12	13	1
2	3	4	5
6	7	8	9
10	11	12	13
1	2	3	4
5	6	7	8
9	10	11	12
13	1	2	3
4	5	6	7
8	9	10	11
12	13	1	2
3	4	5	6
7	8	9	10
11	12	13	1
2	3	4	5
6	7	8	9
10	11	12	13

TABLE VIII.

Kan.	Muluc.	Ix.	Cauac.
1	2	3	4
5	6	7	8
9	10	11	12
13	1	2	3
4	5	6	7
8	9	10	11
12	13	1	2
3	4	5	6
7	8	9	10
11	12	13	1
2	3	4	5
6	7	8	9
10	11	12	13
1	2	3	4
5	6	7	8
9	10	11	12
13	1	2	3
4	5	6	7
8	9	10	11
12	13	1	2
3	4	5	6
7	8	9	10
11	12	13	1
2	3	4	5
6	7	8	9
10	11	12	13

"There was another number which they called *Ua Katun* and which served them as a key to find the Katunes; according to the order of its march it falls on the *Uayeb haab*, and revolves to the end of certain years, Katunes 13, 9, 5, 1, 10, 6, 2, 11, 7, 3, 12, 8, 4." By commencing at the bottom of either column of our table of years, and running up, we will find precisely these numbers, and in the order here given. It is scarcely possible these could have been obtained except by a table of years similar to those we have given. Be this as it may, the fact that these numerals and characters, as here interpreted, include a continuous period, is too plain to be ignored. The agreement in so many numbers and the order in which they come cannot be accidental.

From this we are justified in concluding, 1st. That these day characters are used simply to represent days; 2d. That the red numerals are used to denote the days or years of the Maya " week " (as their period of 13 days and years has been termed, though they applied no name to it), which is corroborated by the fact that with the exception of two on the title page, none in the manuscript denote a greater number than 13 (there is one other apparent exception, but the additional dot is a blotch or evident mistake); 3d. That the day columns are to be read from the top downwards; 4th. That Landa's characters for the Maya days are correct; and 5th. That the work is some kind of a calendar, probably containing directions to be followed by the priests and people in reference to their religious duties. Now let us apply our theory to the day columns and numerals found in some of the other plates.

We select as our first example the column in the lower division of Plate XXVI, as here both the red and black numerals are 13 throughout. The day characters are those for Ahau, Eb, Kan, Cib and Lamat, in the order here given. According to the interpretation suggested, the red numerals refer to the days of the week and the black to the days of the month. Proceeding upon this assumption, we will now try to find out, by using these numbers, in what years 13 Ahau, 13 Eb, 13 Kan, 13 Cib and 13 Lamat are to be found in the 13th month. The result is as follows:

	13 Ahau.	*13 Eb.*	*13 Kan.*	*13 Cib.*	*13 Lamat.*
Years....	6 Cauac	7 Cauac	2 Cauac	3 Cauac	11 Cauac
"	4 Kan	12 Kan	7 Kan	8 Kan	3 Kan
"	9 Muluc	4 Muluc	5 Muluc	13 Muluc	1 Muluc
"	1 Ix	2 Ix	10 Ix	5 Ix	6 Ix

TABLE IX.

Cauac.	Kan.	Muluc.	Ix.
10	11	12	13
1	2	3	4
5	6	7	8
9	10	11	12
13	1	2	3
4	5	6	7
8	9	10	11
12	13	1	2
3	4	5	6
7	8	9	10
11	12	13	1
2	3	4	5
6	7	8	9
10	11	12	13
1	2	3	4
5	6	7	8
9	10	11	12
13	1	2	3
4	5	6	7
8	9	10	11

In order to bring clearly before the eye the places in the cycle where these years fall, we give here the Cauac table governing the period embraced in the four plates heretofore alluded to. Marking the numbers, we find a continuous period of twenty years, possibly one Katun, though not in the precise order we would expect it, that is, it does not include five complete transverse lines. If we use the Kan table, we obtain the same result, except that then we shall have three years in the uppermost line and but one in the lowest. The years of this period are surrounded by a continuous dark line.

As Plate XXVII appears to be a continuation of the same subject as that presented on Plate XXVI, we select the day column of the upper division. The days are 11 Ahau, 11 Eb, 11 Kan, 11 Cib and 11 Lamat—the months all the 13th. This gives us the following years:

	11 Ahau.	*11 Eb.*	*11 Kan.*	*11 Cib.*	*11 Lamat.*
Years....	4 Cauac	5 Cauac	13 Cauac	1 Cauac	9 Cauac
"	2 Kan	10 Kan	5 Kan	6 Kan	1 Kan
"	7 Muluc	2 Muluc	3 Muluc	11 Muluc	12 Muluc
"	12 Ix	13 Ix	8 Ix	3 Ix	4 Ix

The numbers which are surrounded in the table by a waved line, also form, as we see, a continuous period of twenty years. We likewise observe that between the periods there is an interval of four years.

Plates VII, VIII, IX and X, of the second part of the manuscript furnish perhaps the strongest proof of the correctness of my interpretation of the red numerals. The middle division of these plates evidently refers to one subject. Here we find thirteen short columns, of three day characters each, inserted in the text, each character with red numerals over it, and each column with black numerals at the bottom denoting 17, as the month. We give here the names of the days with the number of each as shown by the red numerals; the order in which the columns occur is

also preserved although we have strong doubts as to the correctness of Brasseur's paging.

6 Cib	13 Cib	4 Cib	11 Cib	5 Cib	12 Cib	2 Cib
7 Caban	1 Caban	5 Caban	12 Caban	6 Caban	13 Caban	3 Caban
8 Ezanab	2 Ezanab	6 Ezanab	13 Ezanab	7 Ezanab	1 Ezanab	4 Ezanab

9 Cib	3 Cib	10 Cib	7 Cib	1 Cib	8 Cib
10 Caban	4 Caban	11 Caban	8 Caban	2 Caban	9 Caban
11 Ezanab	5 Ezanab	12 Ezanab	9 Ezanab	3 Ezanab	10 Ezanab

We see by examining the list of days in the Table No. II, that these three days follow each other in the order here given, thus: if the first is 6 Cib, the next is 7 Caban and the next 8 Ezanab. It follows, therefore, that the three days of any one of these groups must fall in the same month[1] and year, hence we have to search for but four years for each column—but $4 \times 13 = 52$ years, an entire cycle. As the three numbers in a group will sufficiently designate the group, we will omit the names.

		Years.	Years.	Years.	Years.
6, 7, 8	7 Cauac	12 Kan	4 Muluc	9 Ix
13, 1, 2	I "	6 "	11 "	3 "
4, 5, 6	5 "	10 "	2 "	7 "
11, 12, 13	12 "	4 "	9 "	I "
5, 6, 7	6 "	11 "	3 "	8 "
12, 13, 1 13	"	5 "	10 "	2 "
2, 3, 4	3 "	8 "	13 "	5 "
9, 10, 11 10	"	2 "	7 "	12 "
3, 4, 5	4 "	9 "	I "	6 "
10, 11, 12 11	"	3 "	8 "	13 "
7, 8, 9	8 "	13 "	5 "	10 "
1, 2, 3	2 "	7 "	12 "	4 "
8, 9, 10	9 "	I "	6 "	11 "

TABLE X.

Canac.	Kan.	Muluc.	Ix.
10	11	12	13
1*	2*	3*	4*
5*	6*	7*	8*
9*	10*	11*	12*
13*	1*	2*	3*
4*	5*	6*	7*
8*	9*	10*	11*
12*	13*	1*	2*
3*	4*	5*	6*
7*	8*	9*	10*
11*	12*	13*	1*
2*	3*	4*	5*
6*	7*	8*	9*
10*	11*	12*	13*
1	2	3	4

If we mark in the table the numbers corresponding with these years, we find that they make one complete cycle, neither more nor less. It is true we should find the same result, no matter where we begin in the cycle, but the point insisted on is, that they form a continuous term corresponding with one of the Maya periods.

We give one more example. In the second division of Plates xxx and xxxi commencing on the left half of the former and continuing through the latter, we find a series of similar figures, except the

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[1] It is not necessary as a matter of course, that three successive days always fall in the same month, but in this case they do. In the Dresden codex plates 51–58, we find similar three day columns, some of which do not conform to this rule.

one on the right of the first plate, which is the god Tlaloc, or
Maya equivalent. Over each figure are red numerals differing in
number, and in front black numerals all denoting 11. The red
numerals are (?) 9, 7, 5, 3. The first is obliterated, but judging
from the space, is 1, but by the succession, is 11; however, as the
result will be the same except as to the position of the period in
the table, it does not make any material difference for present
purposes, which we select. For reasons not necessary to be dis-
cussed here, notwithstanding the strong evidence afforded by the
succession of numbers, we are inclined to believe the missing
number was 1, and that the order was 9, 1, 3, 5, 7. The days
found at the left of the compartment on Plate XXXI, are Kan, Cib,
Lamat, Ahau, Eb; as each numeral applies to each day, the
number of years indicated will be $5 \times 5 \times 4 = 100$, and will be as
follows, the month being the 11th in each case:

	9 *Kan.*	9 *Cib.*	9 *Lamat.*	9 *Ahau.*	9 *Eb.*
Years....12 Cauac	13 Cauac	8 Cauac	3 Cauac	4 Cauac
" .... 4 Kan	5 Kan	13 Kan	1 Kan	9 Kan
" .... 2 Muluc	10 Muluc	11 Muluc	6 Muluc	1 Muluc
" .... 7 Ix	2 Ix	3 Ix	11 Ix	12 Ix

	7 *Kan.*	7 *Cib.*	7 *Lamat.*	7 *Ahau.*	7 *Eb.*
Years....10 Cauac	11 Cauac	6 Cauac	1 Cauac	2 Cauac
" .... 2 Kan	3 Kan	11 Kan	12 Kan	7 Kan
" ....13 Muluc	8 Muluc	9 Muluc	4 Muluc	12 Muluc
" .... 5 Ix	13 Ix	1 Ix	9 Ix	10 Ix

	5 *Kan.*	5 *Cib.*	5 *Lamat.*	5 *Ahau.*	5 *Eb.*
Years.... 8 Cauac	9 Cauac	4 Cauac	12 Cauac	13 Cauac
" ....13 Kan	1 Kan	9 Kan	10 Kan	5 Kan
" ....11 Muluc	6 Muluc	7 Muluc	2 Muluc	10 Muluc
" .... 3 Ix	11 Ix	12 Ix	7 Ix	8 Ix

	3 *Kan.*	3 *Cib.*	3 *Lamat.*	3 *Ahau.*	3 *Eb.*
Years.... 6 Cauac	7 Cauac	2 Cauac	10 Cauac	11 Cauac
" ....11 Kan	12 Kan	7 Kan	8 Kan	3 Kan
" .... 9 Muluc	4 Muluc	5 Muluc	13 Muluc	8 Muluc
" .... 1 Ix	9 Ix	10 Ix	5 Ix	6 Ix

	1 *Kan.*	1 *Cib.*	1 *Lamat.*	1 *Ahau.*	1 *Eb.*
Years.... 4 Cauac	5 Cauac	13 Cauac	8 Cauac	9 Cauac
" .... 9 Kan	10 Kan	5 Kan	6 Kan	1 Kan
" .... 7 Muluc	2 Muluc	3 Muluc	11 Muluc	6 Muluc
" ....12 Ix	7 Ix	8 Ix	3 Ix	4 Ix

We give here a table running through four cycles, on which
we mark the five periods indicated by the preceding list. Each,

as a matter of course, embraces twenty years, but we observe

TABLE XI.

Cauac.	Kan.	Muluc.	Ix.
1	2	3	4
5	6	7	8
9	10	11*	12*
13*	1*	2*	3*
4*	5*	6*	7*
8*	9*	10*	11*
12*	13*	1*	2*
3*	4*	5	6
7	8	9*	10*
11*	12*	13*	1*
2*	3*	4*	5*
6*	7*	8*	9*
10*	11*	12*	13*
1*	2*	3	4
5	6	7*	8*
9*	10*	11*	12*
13*	1*	2*	3*
4*	5*	6*	7*
8*	9*	10*	11*
12*	13*	1	2
3	4	5*	6*
7*	8*	9*	10*
11*	12*	13*	1*
2*	3*	4*	5*
6*	7*	8*	9*
10*	11*	12	13

1	2	3*	4*
5*	6*	7*	8*
9*	10*	11*	12*
13*	1*	2*	3*
4*	5*	6*	7*
8*	9*	10	11
12	13	1	2
3	4	5	6
7	8	9	10
11	12	13	1
2	3	4	5
6	7	8	9
10	11	12	13
1	2	3	4
5	6	7	8
9	10	11	12
13	1	2	3
4	5	6	7
8	9	10	11
12	13	1	2
3	4	5	6
7	8	9	10
11	12	13	1
2	3	4	5
6	7	8	9
10	11	12	13

between each period four uncounted years. We must not presume from this that these years are never counted, as this is contradicted not only by the preceding example but by others which might be presented; still it does indicate that the view maintained by Perez was correct. Assuming that a Katun consisted of twenty-four years, we can see from this table why they were numbered in the peculiar manner heretofore mentioned. We see that the years with which the five, here marked, begin, are 11, 9, 7, 5, 3, in other words this order necessarily follows if the Katun or Ahau (we prefer the name Katun) consists of 24 years. If the upper and lower dark lines are extended across so as to include the whole 24 years, the periods will then commence with the years 9, 7, 5, 3, 1, and will, as I believe, give us the correct numbers of these Ahaues.

Our space will not permit us to give further examples or to discuss further the meaning and use of the numerals. But before closing we would ask the reader to turn again to our table No. VII. showing the period indicated by the characters on Plates XX—XXIII. As we see, this embraces part of two cycles, and includes parts of at least three Katuns. If I am correct, it will then include a period of time which was considered notable by that people. If

we turn to Plate xxxiii, where Cauac is the ruling character, we find, as I think, in the figures of the upper compartment, and in its ground-color, which is of a brownish or twilight tint, indications of the close of some important period of time. We see Ahau with a fiery red face sinking out of sight in the lower, left-hand corner, casting back, as represented by the torch in his hand, his fiery beams as he sinks below the western horizon. We say " sinks below," because, just above is another (headless) figure on which is the character Caban or Cab which signifies " to descend," and the machete. The dark figure to the right drops ten white balls, to the last or upper of which he points one finger; while just above it we see a single dark one, with a slender streak of light in it, just leaving the hand. If we cast our eyes over the Cauac column of the tables we see that *ten*, of the first cycle, is followed by *one*, of the second. This 10 corresponds with the 10 Cauac year in the next to the last group in Table xi. To the left, and directly in front of the face of the dark figure, are two characters connected, the lower one Cauac, the upper a rather unusual form of Ix. We have in this a symbol of the meeting of the two periods, the one ending with 13 Ix the other commencing with 1 Cauac.

The most conspicuous object in the compartment is the bright blue figure in the upper left-hand corner, on a black ground, surrounded by a white bordering which is crossed by dotted rays, each ending with a small round character. By counting, we find there are just twenty-three of these rays, but exactly where the dagger crosses to the eye, is a space for one more—the 24th. One year more will complete the Ahau and then its light will go out forever.
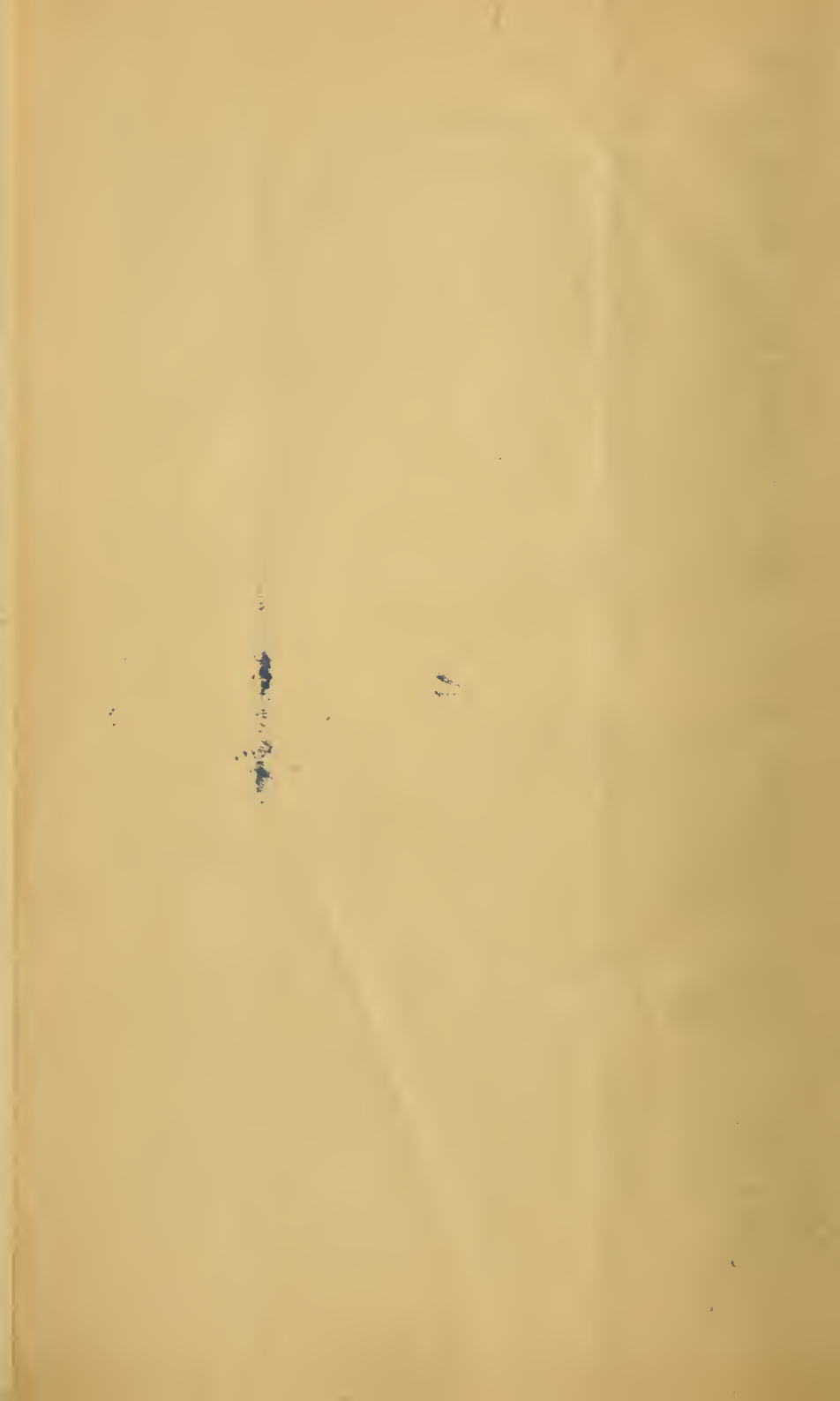
If we notice the single red dot over the second Canac character in the left-hand column of this Plate (xxiii), we observe that it is surrounded by a circle of dots, indicating its importance in some respect.

We might go on to show that the figures in the upper compartments of the four Plates xx—xxiii all relate to the close or commencement of some important period, but our limits will not permit of this, moreover our only object in presenting the foregoing is to call attention to the evidence of the following conclusions :

1st, That the work is a religious calendar of some kind ; 2d,

that the day characters are used for the purpose of designating the days and not for the signification of the words; 3d, that Landa's characters for the day are at least substantially correct; 4th, that the columns composed of these characters are to be read from the top downwards; 5th, that the red numerals refer to the days or years of the week; and 6th, that the black numerals in connection with the day characters, as well as those in the spaces, usually refer to the numbers of the month. There are some apparent exceptions, but I have ascertained, as I can show, that these are only apparent and not real exceptions. I may also add that we have in what has been shown strong evidence that Perez was right in asserting that the Ahau consisted of 24 years.

I have succeeded in deciphering a number of the hieroglyphics of the text but will not enter upon an explanation of these at present, as I have only commenced this part of the work.